

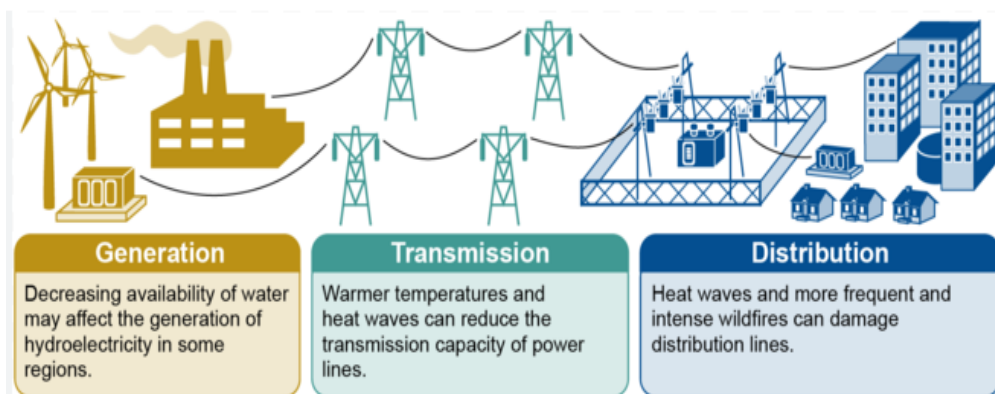
## Climate Change and Electricity

### Why in news?

The Power Ministry needs to reassess the National Electricity Plan (NEP) due to increased electricity demand and consumption from rising heat waves and humidity in recent years.

### What are the impacts of climate change on electricity?

- **Higher demand & consumption** - Warmer temperatures lead to increased use of air conditioning, raising overall electricity demand, especially during peak summer periods.
- **Increased transmission Losses** - Elevated temperatures increase resistance in power lines, leading to higher transmission losses.
- **Cooling water shortages** - Reduced water availability can lead to operational restrictions or shutdowns.
- Thermoelectric and nuclear power plants require significant amounts of water for cooling.
- **Damages infrastructure** - Hurricanes, storms, and floods can damage power lines, substations, and generation facilities, leading to outages and costly repairs.
- **Risk of blackouts** - Extreme weather increases the risk of blackouts and requires investments in grid resilience.
- **Reduces efficiency** - Higher temperatures reduce the efficiency of power plants.



### What is National Electricity Plan (NEP)?

- **Launch** - The first NEP was *formulated in 2005*.
- **Preparation** - *Electricity Act, 2003* mandates that the central government shall prepare the NEP in consultation with the state governments and the Central Electricity Authority.
- **Aim** - To meet the energy needs of high economic growth & electricity consumption of about 1.3 billion people.

- The capacity additions forecasts considered the impact of factors like
  - Energy efficiency
  - Penetration of electric vehicles
  - Production of green hydrogen on peak and energy demands.

### Status of Electricity in India (2005-2021)

- **Generating capacity** - Between 2005 and 2021, generation capacity (inclusive of renewable capacity) has *gone up by about 251 GW*.
- **Renewable energy** - The renewable generating capacity has *gone up to 94 GW* (from wind, solar, small hydro and biomass) from almost nothing.
- **Per capita consumption** - It has *almost doubled* from 630 units to *approximately 1,200 units today*.
- **Rural electrification** - It is almost complete with *near 100% electricity access* to households (not necessarily 24 hours supply).

- **Policy revision** - The Ministry of Power revisits the NEP every five years to forecast the country's power generation, transmission and demand trajectory for the coming decade.
- In May 2023, the Central Electricity Authority notified the NEP (Vol-I Generation) for the period 2022-32.

### Why NEP needs to be revised?

- The *constantly-evolving weather patterns* have skewed the government's electricity demand projections.
- **In 2024** - There has been an *exceptional rise of weather-related energy consumption*.
- April-June was marked by sweltering temperatures coupled with intense heat waves across North India leading to a higher requirement for pushing up electricity demand.
- **Increased power consumption** - During April 2024 power consumption rose 11% year on year.
  - The growth in May was steeper at 15% and in June, the usage rose roughly 9%.
- **Mismatch in the demand projections** - For instance, the Ministry projected a peak demand (day) of 235 GW during May, but it hit an all-time high of 250 GW on May 30.
- The projection for June was 240 GW, but the demand went up to over 245 GW.
- **Sector wise changes** - Farm sector is experiencing changes in consumption patterns because the country is trying to meet agriculture demand during the day, which means that *demand will shift from night to day*.

### What lies ahead?

- **Evaluate requirements** - On how our demand is evolving and what sectors are likely to contribute significantly.
- **Assess overall capacity requirement** - This can address varying levels of demand on monthly, weekly, daily and hourly bases, including seasonal variations.
- This is crucial for ensuring grid stability and reliable power supply.
- **Analyse the mix of power plants** - Both scheduled and intermittent plants have to be analysed.
- **Increase the capacity** - The peak demand could surpass 400 GW by 2032 and thus we need to have 900 GW of total installed capacity by 2031-32 and that

- **Save energy** - Individuals and companies can take many actions to save energy.
  - For example, look for ENERGY STAR certified products, such as appliances and electronics.
- **Expand access to clean technologies** -Promote wind and solar power, so that all communities benefit.
- This transition will help reduce the emissions contributing to climate change.
- **Modernize infrastructure** - Utilities and government agencies can update energy infrastructure, such as *leak-prone pipelines and aging power lines*.
- These actions increase resiliency, improve safety, and protect public health.
- **Ensure energy equity** - Policymakers, industry leaders, and communities can take steps to improve energy affordability and ensure all people have a voice in energy planning.
- **Make infrastructure local** - Utilities, urban planners, and government agencies can use microgrids.
- These systems and other decentralized energy infrastructure help make electricity supplies more resilient to extreme weather.

## References

1. [The Hindu BusinessLine| Reviewing National Electricity Plans](#)
2. [EPA| Impacts of Climate Change on Electricity](#)

